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Climatological relationships which allow transformations among several common oceanographic variables have been developed for the Northwest Atlantic from profiles of temperature and salinity extracted from the Navy's Master Oceanographic Observation Data Set (MOODS). All pairs of temperature and salinity profiles extending from the surface to at least 100 m were edited and then extended to 2000 m by optimal interpolation. Profiles from the Generalized Digital Environmental Model (GDEM) climatology were used as the assumed mean, and the between-depth temperature and salinity covariances were derived from the data set. Empirical Orthogonal Functions (EOFs) of the temperature and salinity vertical structure were computed from the extended data set. Each profile was then compressed to the amplitudes of the first three EOFs. The error variance for profiles reconstructed from the first three EOFs is only 4% of original profile variance (computed over the entire data set). Step-wise least-squares regressions among temperature and salinity EOF amplitudes, dynamic heights, and surface temperatures were used to construct several relationships: temperature or salinity amplitudes as a function of dynamic height (or as a function of dynamic height and surface temperature), salinity amplitudes as functions of temperature amplitudes, and dynamic height as a function of temperature amplitudes. Thus for example, given a surface dynamic height (which may be derived from an altimeter measurement), temperature (salinity) EOF amplitudes are derived using the regression relationships, and the temperature (salinity) profile can then be constructed as the sum of the products of corresponding amplitudes and EOFs. Errors in derived profiles (or heights) were evaluated over all profiles in the original data set.

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